

Model for SME Sector Development

By Professor Saburo Kameyama, Faculty of Commerce, Chuo University,
Saburo Kameyama, Faculty of Commerce, Chuo University,
E-mail: kameyama@tamacc.chuo-u.ac.jp
Hidenori Kobayashi, Faculty of Policy Studies, Chuo University,
E-mail: kobaken0@fps.chuo-u.ac.jp
Toru Suetake, Arthur Andersen, Tokyo
E-mail: tohru.suetake@jp.artjurandersen.com

Abstract

SME: Small and Medium Enterprise sector development is one of the key issues in external cooperation by developed countries to developing countries recently. Development of SME sector is important for strengthening the leading industries with the assistance of SME as support industries. In addition, SME development is the future candidate of leading industry because every leading enterprise has had the experience of starting their business as a SME. The future of the industry is dependent on the development of SME. For the labor market, SME development is also an important issue because it employs the labor force and offers wages to workers. In those terms, development of the SME sector could be not only the key issue of industry development but also socio-economic development for every country.

The Japanese government developed many tools for SME development and has been quite successful with their performance during the past several decades. However, according to our experiences, although incentive tools for development of the SME sector have been used effectively, there are some difficulties that mainly come from the circumstantial nature surrounding SME. Basically the SME sector has a complex nature and it is the reason why the SME sector can be sustained

We are trying to develop a standard SME sector model and examine the effectiveness of incentive tools for providing powerful decision making support tools for industry development planning staff of governments.

Key word: SME, industry, macro economy

1. Introduction

SME sector development is one of the key issues for many countries both for advanced countries including USA, JAPAN, and many East European countries, but also for developing countries including Indonesia, the Philippines and China.

From December 1999 to March 2000, and May to June 2000, we conducted a series of studies on SME sector development policy and policy structure including policy tools in developing countries and international assistance agencies. We visited multi-lateral international assistance agencies of the World Bank, IDBA, EBRD and the Asian Development Bank. We visited bilateral development assistance agencies of USAID and JICA, JBIC, and the Ministry of International Trade and Industry in Japan. We visited the developing countries of Bulgaria, Poland, the Philippines, Thailand, Cambodia, Laos PDR, Bangladesh, Malaysia, Indonesia, Vietnam and two municipal governments of China (Shenyang and Hanzong). We also visited and studied OECD on their SME sector development. Based on those studies, we first categorized SME development policies of those countries and then developed a standard SME sector model to check the effectiveness of those SME development tools and policies on their developing scenarios.

2. Objectives of SME sector development

Based on those studies we found that objectives or aims of SME development policy may briefly be put into the four following categories:

- 1) *For creation as industry itself*: There are countries which do not have modern industry, typically in the least developed countries such as Laos PDR and Cambodia. In those countries, almost all enterprise is micro enterprise and SME are rare. The first key issue for those countries is creation of enterprise itself. It is also true in China for basically, there was no private enterprise and all enterprises were state owned. However, creation of pure private SME is an essential issue for China for smooth implementation of privatization.
- 2) *For creation as support industry*: There are countries which do not have strong support industry, typically in newly developed countries in South East Asia such as Indonesia, the Philippines and Malaysia. They have several large international enterprises and also many multi-national enterprises who invest in those countries. However, industry structure is not so strong due mainly to problems coming from their supply-chain structures. Industry development policies of those countries focus on mainly tie in network between leading industry and SME as support industry.
- 3) *Industry sector reform*: Industry sector reform is another key issue in every country. China is facing the privatization of its state owned enterprises. They need SME to absorb the excess labor forces from SOE. Many East European countries are trying to change the industry structure which formerly focused on non-efficient heavy industry to balanced industrial structure with increased focus on light industry and modern industry. Every country has keen interest on development of IT industry and has or is developing many incentive tools including direct finance mechanism. IT industry may be thought of as a magic box which can quickly turn on the industry of a country even in the least developed countries such as Laos PRD and Cambodia. This may also be true for advanced countries such as USA for they always need new leading industries and SME sector development is first stage. With SME sector development, they may find several new industries that could be the candidates of leading industry in the next generation.
- 4) *Labor force absorption*: SME absorbs the over capacity of labor market effectively. Many countries including China and developing countries could not handle labor issues mostly over capacity of old economy and shortage of new economy. Especially, China and former communist countries have been transferring state owned enterprises into privately owned ones and have faced unemployment problems. SME sector development is a keen issue for them to absorb such unemployment.

However, the problem of setting the SME sector development policy is mixed with those aims and can not be clearly simplified. On the other hand, policy tools are always simplified and a limitation is set. For this limitation, government prepares as many tools as possible and must use them with combination. Therefore, we considered the tools standard framework is very important before starting to develop the standard SME sector model.

3. SME Basic law

The existence of a basic law for SME is important for give to establish the framework of sector development. Normally, in under SME basic law, determined size of SME and mapped related laws, and regulations policy tools are conducted by executing agencies. Although there are arguments of over the necessity of SME basic laws and some countries insist on covering their industry development laws or commerce laws, however, we find the existing suitable SME basic law is a key issues for makes smooth and effective SME sector development. Although without SME basic law, some countries such as Malaysia could conduct SME sector development smoothly and successfully but having rich and varied SME sector development tools and consistency of SME sector development policy are the reasons of success in these countries. Especially, long-term consistency of SME sector development policy itself works as a kind of SME basic law. With the use of the long-term policy consistency, it may be said that they create tacit SME basic law. SME basic law is very useful to operate and extend SME sector development in terms of giving the core policy framework. For this reason, many countries including Thailand and China recently decided to establish the SME basic law. Normally, in SME basic law, the following items are determined:

- *Determination of SME.* Normally SME determines the number of employees and/or sales amount. From studies of 12 countries, we noticed that the number of employees of SME is around below 200 to 300. Also many countries use three categories of SME, into three, micro-enterprise, small enterprise and medium size enterprise. Micro enterprise is normally under 10 employees and operates mainly as family business.
- *Framework of incentive policy tools.* Basic idea of industry development is free competition. However, every government will try to give some incentive mechanism, some of them are for setting a level playing field and others are for determining the roles and responsibilities of related government agencies. Also determining the relationship with other related laws and regulations pre and post established.

4. Tools for SME sector development

Japan may be one of the successful countries in SME sector development. 99% of Japanese companies are SME and this SME sector hired 78% of the labor forces, shared 50% of shipping and sales trade in total trade in Japan during 1998 to 1999. Of course, the situations of almost all countries are like that. More than 90% of the companies are SME in all countries.

Table 1: Category of SME sector incentive tools.

Category	Tools
A) Finance	A1) Lending and guarantee scheme for SME
	A2) Direct finance (Investment and venture capital)
	A3) Taxation for SME and incentive tax
B) Management Reform	B1) Management reform
	B2) Creation of new business
	B3) Creation of new technology
C) Strengthening of Management Infrastructure	C1) Management resource
	C2) Cooperative
	C3) Industry integration
	C4) Commerce integration
	C5) Distribution industry
	C6) Labor issue
	C7) Fair trade
	C8) Support Industry
	C9) Government procurement
D) Environment	
E) Micro enterprise	

For development of SME sector, Japanese government, the Ministry of Economy and Industry (former Ministry of International Trade and Industry) has been developing many incentive tools. The idea and concept of the SME development policy by the Ministry of Economy and Finance may be categorized as follows. This is one of example for SME sector development tools.

- A) **Finance:** Finance is a fundamental issue for every SME. There are two financial schemes, direct (investment) and non-direct (lending). In non-direct financial scheme for SME, several governments have funds for SME or government banks have provided funds for SME. Some countries like Japan and Malaysia have many lending programs for SME and settle the lending amount and interest rate, guarantee scheme for leading SME sector development and/or industry sector development. Also for non-direct financial scheme, guarantee scheme by government is very important for many SME does not have enough mortgages. Several governments have in such government guarantee schemes for lending to SME. Typically, government established the fund for guarantee and this government owned fund provides guarantee to the bank for SME whom want to borrow money from that bank. However, many international assistance agencies including

IMF and the World Bank is not affirmative on non-direct financial schemes by government for it's against economic principles of free competition in the free market.

Incentive tax also has been a very useful tools for SME development for a long time. It could be effectively control the self-development power of SME. However, many developing countries do not have strong taxation capabilities in central government and some of SME could escape from the tax. Also, many international assistance agencies do not agree to set incentive taxes for it is against economic principles of level playing field. For these reasons, many countries shift to an indirect tax system which gets government incomes from such as value added tax.

- B) **Management Reform:** Management system and structure of SME is very primitive stage or not modernized in many cases. In case of Japan, government sets three assistance components in management reform for SME. First one is management reform itself and provides technical and financial assistance to introduce a modern management system such as transfer from family business or small cooperation organization to modern corporate or limited company. Second scheme is assistance to create new business. Many countries also have in this new business creation assistance scheme as venture capital scheme and give financial support or tax incentives. Third assistance scheme is new technology development. SBIR of USA is very famous in this scheme. Other countries also have in such schemes and provide material, testing facilities and tools, equipment, researchers and experts as advisors, technical matching services and human resources matching services.
- C) **Strengthening of management infrastructure:** This is composed of nine tools groups.
- C1) *Management resource:* This category of tools purpose to establish enough management resources. Shortage of management resources including human resources is a key issues for strengthening SME management infrastructure. In many countries, government established the SME center and provides consulting services and matching services. Japan has a unique system to certify SME consultants with government certified SME consultants and also provide consulting services by those certified SME consultants for improving management of SME in technical, financial, marketing and training area. Also in this category, there are tools for assisting training to manager and employees in the area of technology, accounting and management. Tools to assist to export, saving energy and environment issues are also in this category.
- C2) *Cooperative:* Establishing the cooperative unit by SME is another scheme for strengthening the SME organization. Japanese government assists to establish the cooperative unit by integrating SME and then transforming it in to a normal cooperative or limited company.
- C3) *Industry integration:* Industry integration has two characteristics for SME development. One is economy economic development in local areas and the other is strengthening management infrastructure by integration of management resources.
- C4) *Commerce integration:* Commerce integration is another scheme and also have has two characteristics same in common with industry integration. One is economic development in commerce area with through adjustment of large-scale retail shops such as department stores and super markets. Two typical trends happen in Japan related to this commerce integration. With acceleration of rural type large scale shopping malls, which mainly focus on the customer coming by car, old commerce areas near the railway terminal become unpopulated. Also large-scale retail shopping stores abolish the branch stores in the old commercial areas due to the for recession and cut low profit stores. Revitalization of old commerce areas or re-development of former commerce areas is one of the key issues for this commerce integration policy. The other issue in commerce is, over population and unpopulated issues. Unbalance of population and domestic immigration problems cause big gaps of in commerce areas. Some adjustment is necessary with re-development and re-vitalization of commerce areas. Another is strengthening SME management infrastructure.
- C5) *Distribution industry:* Distribution industry also has faces big problems especially as the world turns into the e-commerce and the IT ages. Once, distribution industry had roles of finance, stock adjustment and information providing to both supplier and retailer and those roles make create some value added value to this industry. However, e-commerce changed the situation and lean production has made those roles of the distribution industry less necessary on those roles by distribution industry. In the case of Japan, government established the assistance tools for

integration of SME distributors and SME retailers, created unique and advanced SME retailers and transformed it into a much more efficient and effective system linkage between distributors and retailers.

- C6) *Labor issue*: Labor issues are one of the main issues for SME. Protection and management of the labor market is the responsibility of the Ministry of Labor in Japan. MITI in Japan rather focuses on training for employees or encourages the improvement of capability and establishes and promotes the stability of the labor market. Other countries rather only focus on training and human resources matching services and lack labor market stabilization methods to take balance of the supply side and demand side.
- C7) *Fair trade or trade fairness*: SME especially SME in support industry have a handicap on trade with large companies. Many governments have trade fairness laws and regulations but Japan has a specific one on trade between large companies and SME in support industry. Another scheme is to develop the support industry with fair trade. Although Japan has an anti-monopoly law but it is not specific for SME, the same as other countries.
- C8) *Support Industry*: Strengthening of support industry is a big characteristic of Japanese style by SME development of Japanese style. Characteristics or system of companies is different with between Japanese style and other countries, especially Europe and America. Japanese manufacturing companies rather have a system composed to support industrial manufacturers and make clear roles and responsibility. It looks like a pyramid structure. Therefore, big and leading companies leave the parts manufacturing to support industry manufacturers and focus on R&D, marketing and assembling. That is the reason that strengthening support industry is a key issue not only SME sector development but also strengthening leading industry in Japan. In Europe and America, big manufacturers, they rather want to make all parts by themselves, so called one stop manufacturing. However, this style of manufacturing has changed even in Europe and America and they now choose to purchase parts from support industry manufacturers. Developing countries such as Indonesia, the Philippines and even Malaysia, have established a local support industry and created strong linkage and ties in with big, leading manufacturers and sometimes with multinational manufacturers whom invested in their countries. This is a key success factor for their industry development.
- C9) *Government procurement assists SME*: To help and assist SME sector development, some countries such as Japan, Poland and Bulgaria have a system to purchase material and goods from SME.
- D) **Environment**: Environment assistance tools in this category do not have narrow meaning in Japan. It includes protection and prevention from bankruptcy, disaster and socio-economic structure adjustment. Protection and prevention of bankruptcy is a kind of safety net for SME. In Japan, they prepare lawyer and arbitrator in all branch offices of Japan Chamber of Commerce and provide arbitration services. Also for prevention of bankruptcy by bankruptcy of trade partner or supplier, emergency government finance scheme is prepared. Also another emergency finance scheme and insurance scheme for natural disasters or accidents are prepared. With these social safety nets, MITI tries to forward smoothly industrial structure adjustment. Other countries have rather narrow assisting tools only focusing on environmental issues such as transfer of raw material to green products or recycling.
- E) **Micro enterprise**: SME is clearly separated from micro enterprises. Many countries are also separate with SME and micro enterprise but some countries still put them into the same category. However, separation is very important. In many countries and international assistance agencies, SME development policy focuses not only on development for SME sector itself but also on micro enterprises, policy with these characteristics is therefore a social safety net.

SME development tools may also be put into two categories, one to assist and give incentives to SME in Japan. These policies aim to strengthen the SME management and encourage them to grow to large and international enterprises. It may be said focus is on SME itself or inner structure strengthening. Second one is tools categorized as the industrial structure adjustment and gives suitable space for

SME on their survival and chance to grow. Tools of many other countries are not so clearly separate on strengthening of SME itself and industry structure adjustment.

We have studied SME development in several developing countries and also policy of international assistance agencies from 1999 to 2000. From this study, we found that the structure of SME sector development tools in Japan is the most advanced and well prepared. For this reason, we decided to use a standard policy tools framework similar to the Japanese one. There are not any non-categorized SME policy tools in this framework nor excess frameworks. Another framework such as the balanced score card became popular. However, the balanced score card framework only focuses on strengthening the management infrastructure of SME and does not consider much on industry structure adjustment and micro enterprise social safety net.

5. Scenario of SME development

There are mainly 5 types of SME development scenarios at the initial stage. Many advanced countries take one or several initial scenarios for success of SME sector development. Surrounding these scenarios or combination of scenarios for industrial development, many incentive tools are used for accelerating the development to shift low level technology products to much value added products and export oriented products.

Table 2: Initial stage

	Type	Characteristics
1	Import replacement	Start with replacement of agriculture related import items with domestic products such as in the area of agriculture tools, chemical fertilizer, and agro-chemicals. Then shift to construction materials and equipment such as cement, iron bars, and galvanized iron sheets. Then shift to light industrial products such as soap and textiles and lastly shift to rather heavy industry such as plastic products. Many countries have used this scenario with success including Korea and Japan.
2	Raw material replacement	Start with replacement of export of raw material to products using raw material in the country. Examples, cotton exporting country shifts to export of textiles or cotton cloth. Also sub-industrial development such as machines for spinning and growth of light and heavy industry. Successful example is, India which went from cotton exporting country to textile exporting country.
3	Integration	Integrate some specific sub industry and increase the brand value and fame with establishment of the an industrial estate or industrial zone and develop a large scale supply chain network. For example, Tubame city of Japan started to focus on manufacturing of tableware and established the brand and fame. Same as Silicon Valley in USA and many successful examples in the world.
4	Castle town type	Support industries are developed surrounding one big firm or plant and expand the industry. Successful examples are many in Japan such as Toyota city, many subsidiaries and part manufacturing enterprises operate business surrounding Toyota or Hitachi city. Many subsidiary companies and related companies were established around Hitachi.
5	Ohta Ward type	It is a new type industry development scenario. Establish a high-tech SME network and develop the industry within the network. Such as Taiwan personal computer maker which found a way to manufacture personal computers with procurement of network from another part manufacturing maker in Taiwan.

Another development scenario starts with agribusiness and industrialization. Along with these development courses, SME sector was also developed to accompany industrialization.

- 1) *Import replacement*: Import replacement not only focuses on SME development scenario but has been a typical success scenario for many countries. Strategy of replacement is very important and normally high custom duties are set for import items to protect domestic products. By domestic industry protection, government also gives incentive tax for export and increases the ration of export items using raw material domestically. However, recent free trade movement (such as WTO) makes it difficult to follow this strategy. Developing countries could not set high custom duties on import items. Therefore, to avoid violating WTO rules, strategy to assist establishment of domestic manufacturers that produce import replacement goods and supplier link with those manufacturers, and then strengthening management and technical capability and assist marketing could be one of the choices. Second important key success factor is combination and order (prioritization) of developing sub industry. Normally, replacement with simple and low technology products in first stage. But recently, instead replacement with agricultural machines, agricultural chemicals, fertilizer in first stage but start with replacement of construction materials such as cement, iron pipe and iron plate for linking with development of agriculture infrastructure such as building of irrigation systems.
- 2) *Raw material replacement*: Also many developing countries take this strategy. Not only export of raw materials produced in the country but also shift to replacing this raw material with products using this raw material. Typically, cotton, crude oil and natural gas producing countries take in such strategy. Government provides technical support and assists new products development and establishes the manufacturing company. Also along with this assistance, establishment and development of supply chain is very important. However, there are several unsuccessful cases. Textile industry in India started with replacement of cotton. However, they could not take price leadership in the world market and could not increase the export of both cotton and textiles as expected for they failed to improve the quality of their product, mainly. For agriculture countries, improvement of quality itself is a key issue but some countries such as Jamaica have been successful in establishing brand on agriculture products. (Blue Mountain coffee of Jamaica is one of those success cases.) Ohta prefecture of Japan is another success case of this strategy. They established one famous product in each municipality as brand and also used strategies for establishing the total brand image of Ohta prefecture combined with each municipal product.
- 3) *Integration*: Integration of SME is one of the typical industrial development strategies taken by many countries. Integration makes scale merits on supply chain and bargain power for procurement, sales and incentive negotiation with local and central government. The design of integration depends on the nature and characteristics of the people and nations. Government initiatives make rather single category industry integration but large scale such as textile and spine industry, metal and machine, and electronics. Private initiative integration makes rather small scale and mixed industry. Large-scale single industry integration by government initiatives has been thought of as a useful solution for development and acceleration of SME development, however, recently the theory rather focuses on the relationship or network within the integration and stresses how to create added value on the manufacturing and logistics. Less developed countries sometimes do not have a strong industry sector at all. In such countries, they start to integrate handy craft industry with cooperation or tie in with tourism industry and make small souvenirs. Then make some sort of brand image such as Ubud of Bali Island, Indonesia that established the fame of woodcuts. However, this is only the first step of the strategy and development toward next stage of industrialization is key issue for SME development.
- 4) *Castle town type*: Natural integration around big companies that create their own subsidiary company for support of their industry, or gather suppliers and distributors and develop the formation of a full set supply chain in one city. SME could have a lot of merit to get orders and technical consultation from big companies. Also for big companies at the head of this supply chain, they have merit to get one stop shop services of supplies from subsidiary companies and companies in support industry. There are so many success cases in Japan such as Toyota city

famous for gathering all Toyota related and subsidiary companies in Toyota city and its suburb area. However, there are some unsuccessful cases such as Hitachi City. They could establish one big supply chain around Hitachi Manufacturing Co., that is one of the big manufacturing companies in Japan. But the recession shrunk the business of this company and related SME faced a difficult situation for they had too much strong linkage with this company. The same situation happened in several castle towns including Nissan, another big carmaker in Japan and several shipyard companies in Kitakyushu, Japan. The same thing happened in USA in Detroit. Shifting to next generation industry and conducting suitable industry structure adjustment by government is always a key issue for this type of industry development.

- 5) *Ohka Ward type*: This type of industrial development is rather new. Establish the information network of SME and work as virtual manufacturing company. In IT industry, many governments are eager to take in this type of strategy to accompany integration. Integration rather focuses on gathering SME into one place but this type is focuses on establishing an information network and acts as one big virtual company, not considering the physical location so much. There are so many successes stories especially in the IT industry. For example, IT SME in Taiwan established an information network and arranged the parts or orders within the network for success to win the big contract from PC manufacturing. Ohka ward of Japan is famous for integrating many high skilled SME manufacturing companies and was successful in getting orders which need high skill manufacturing technology for they can find any kind of technology within the network and arrange the order. Silicon Valley of USA is also of this type. However, establishing an intelligent linkage is a key success factor especially for SME in IT area. Success of Silicon Valley comes from the linkage of university and research institutes in California. Also success of Taiwan PC manufactures comes from speedy custom systems for import and export. Linkage around the network is very important too. Governments must consider the shape of the future network so government must take initiatives in some part and leave others for private initiatives.

Other SME sector development scenarios are focused on so called development processes. Normally less developed countries have a self-sufficient agriculture economy. They must start first with handy craft type manufacturing. Then perform replacement of import goods or export raw material. With this so-called self-development of domestic industry, they can then encourage foreign investment such as invite establishment of factories or subsidiary companies of multi-national companies. Then make linkage or tie in with those companies as leading companies and domestic companies. Also development of support industry is a key success factor in this stage. Last stage is make area-trade-network or free trade zones and accelerates international trade to increase exports.

With strengthening of SME management infrastructure, it is important to make strong SME that have only one unique manufacturing technology or top market share in niche market. In case of Japan, there are so many strong companies that have top market share in the world with only one unique top class manufacturing technology.

6. Model for SME sector development

There should be two characteristics in SME sector development model of SD. One is the management of SME itself. Many political tools work for strengthening of the SME management infrastructure itself. Other side is structure adjustment. Also many political tools try to lead the sector development direction such as accelerating new and potential industry such as IT and conduct industrial adjustment with the other hand. Therefore, SME sector model should have two characteristics. In the SD model, we solve this situation with a two-step approach that starts with development of a micro model for evaluating SME sector development tools that focus on strengthening of their management infrastructure and then build macro model and evaluate tools for structure adjustment in the second step. Micro model sets factors that only make impacts on SME itself and gives structure adjustment factors as exogenous variables. The macro model, which may be called socio-economic model and sets factors related mainly for SME itself sets as exogenous variables and gives the results of simulation by micro model.

7. Micro level sector model.

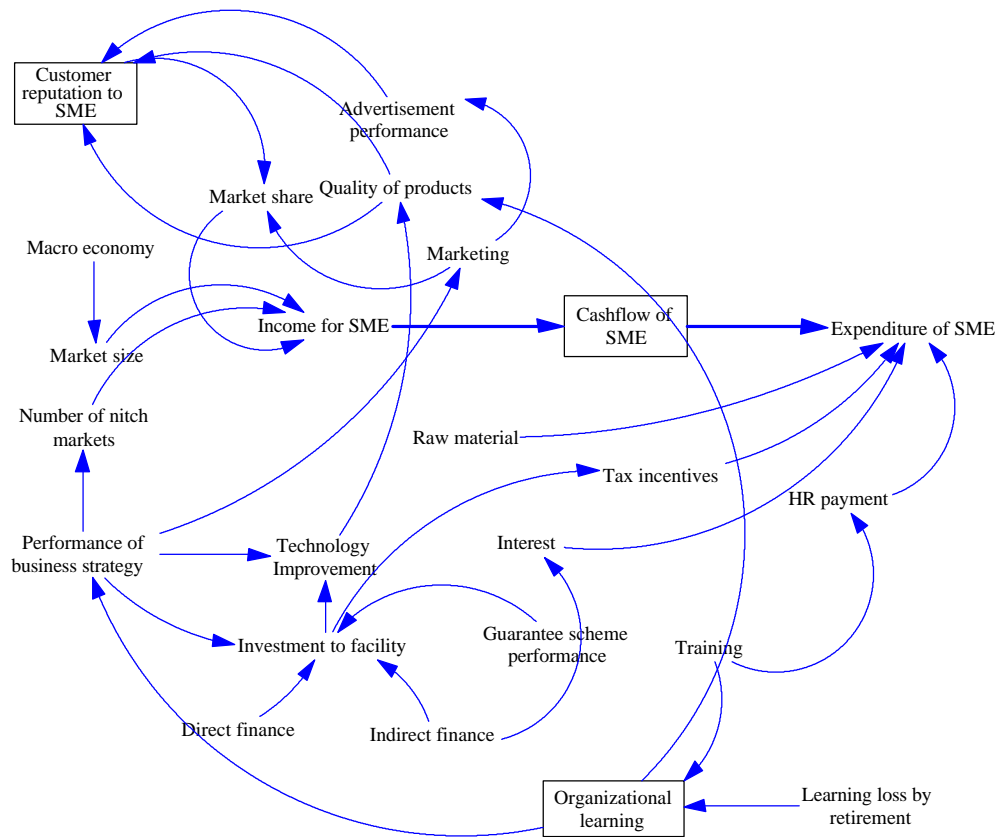


Chart 1: Outline of SME micro model

SME are complex and easily fall into chaotic management situation. This chaotic behavior of SME has been studied by H. Kobayahi (1997).

On the SME micro level sector model, we decided to avoid this complex behavior and made the model rather simple. There are already developed so many models in this world. This model is basically same structure and character with those models but eliminated elements of manufacturing and procurement.

In this model, we focused on cash flow and checked the impact of many SME sector development tools mainly given as incentives for SME with relation to finance, marketing, technology improvement and training which describes a hypothetical situation and the simulation results give great detail. Especially in training field, we focused on accumulation of organizational knowledge and its impact on technology and marketing with their strategy. In other words, SME sector development tools which give incentives of SME create impact through strategy parameters. Also, strategy parameters made impact on the business area and market share interactively. Based on this model, we set the macro economy factor that gives 3 years cycle wave with gradual increase of 5% and flat (no increase) to market size. Delay happened between direct or indirect finance and the investment to facility. Also delay is set between investment to facility to technology improvement, technology improvement to the quality of products, customer reputation to SME and market share, tax incentives and expenditure, interest and expenditure, training and organizational learning. In order to make it simple, we set the interest including return of indirect finance.

7-1) Hypothesis of SME 1: Financial assistance

In many countries, governments have incentive tools to give some direct or indirect financial assistance or guarantee scheme including tax incentives to SME. However, to give financial incentives to SME is criticized by many economist of the world including the World Bank and IMF for these government activities are harmful for free competitive market oriented playing field.

Is it truly harmful for SME development? We have conducted simulation and check the effectiveness of financial assistance to SME and found that financial assistance is always helpful for the management of SME. In this model, we handled direct finance for increasing the income but gave no load to expenditure. Indirect finance also increased the income and increased the expenditure (interest) with delay. Direct finance had much more impact toward cash flow than indirect finance for indirect finance made a big impact toward expenditure. We handled the tax incentives also in the same manner, decrease the expenditure with delay. Even this tax incentive effect for cash flow management of SME was useful. However, problems occurred with delay. SME has always secured finance, that makes it difficult to keep balance between income and expenditure when investment and payment happens. For maintain profitability, SME may have to invest in technology development and productivity improvement, but these investments give financial load in later stage. Quick and timely finance can help and increase the profitability of SME but if too much delay, SME may face bankruptcy for shortage of cash. Compared with large scale enterprises, SME has small capacity to bear the fluctuation of cash flow. It may no need to be said that this fact is matched by the same observation in many countries. As the conclusion of simulation, whether direct, indirect or tax incentives financial assistance is useful and many criticism of financial assistance comes from institutional structure of the government or government organization. Added to the inefficiency of government financial institutions, corruption and unfairness of financial lending or guarantee schemes are a problem. We carefully checked the criticism of government finance but could not find any evidence for negative effects of finance to SME itself. All criticisms are only mentioned mechanism and institutes of financial assistance.

7-2) Hypothesis of SME 2: Impact of the knowledge based economy

We also tried to check the impact of knowledge management and impact of the knowledge store on the organization. Maybe that is the reason why model structure for retirement decreases the storage of knowledge and decreases the performance coming from training, we think knowledge seems to be less impacted compared with other elements such as financial assistance or marketing assistance. In the observation, many governments give training chances to the employee of SME, from handicraft type technique to accounting and management techniques. I myself have been working for development of such technical transfer institution for many developing countries but could not feel so successful. There are arguments that the government should focus on assistance to basic skill development or advanced skill. Recent trends and external assistance by multilateral and bilateral donor agencies rather want to focus on advanced skill such as MBA course development with cooperation of universities and technology institutes. Also it may be related that many developing countries rather want to focus on IT and advanced technology oriented industry development with venture capital investment style and they need skill for management more than basic accounting and management skills or primitive low technology skills development. In this rather simple primitive SME model, we could not confirm the behavior and impact of skills development but rather got a rough idea.

7-3) Hypothesis of SME 3: Impact of marketing assistance

Many governments have official or non official marketing assistance to SME, such as the chamber of commerce and industry that gives market information and the government have exhibitions to promote SME and their products. Maybe this also comes from the structure of the model but as conclusion, profit of SME depends on the market share or market growth. Assistance of marketing is only useful when market share and/or market size is increased in this model. This may also match our observation for many SME in other countries.

8. Macro level sector model.

Macro model is a kind of socio-economic model and we developed two kinds of macro model. First macro model focused on industry sector and evaluated the impact of structure adjustment. We focused on accumulated GDP and how structure adjustment policy works and makes impact on GDP. Structure adjustment promotes productivity and demand from industry sector. The strength of linkage between SME and each sector are given as SME ratios. The basic data of ratio is calculated from the statistics of Japanese government. We use this model to check the other macro model which is shown as chart 3.

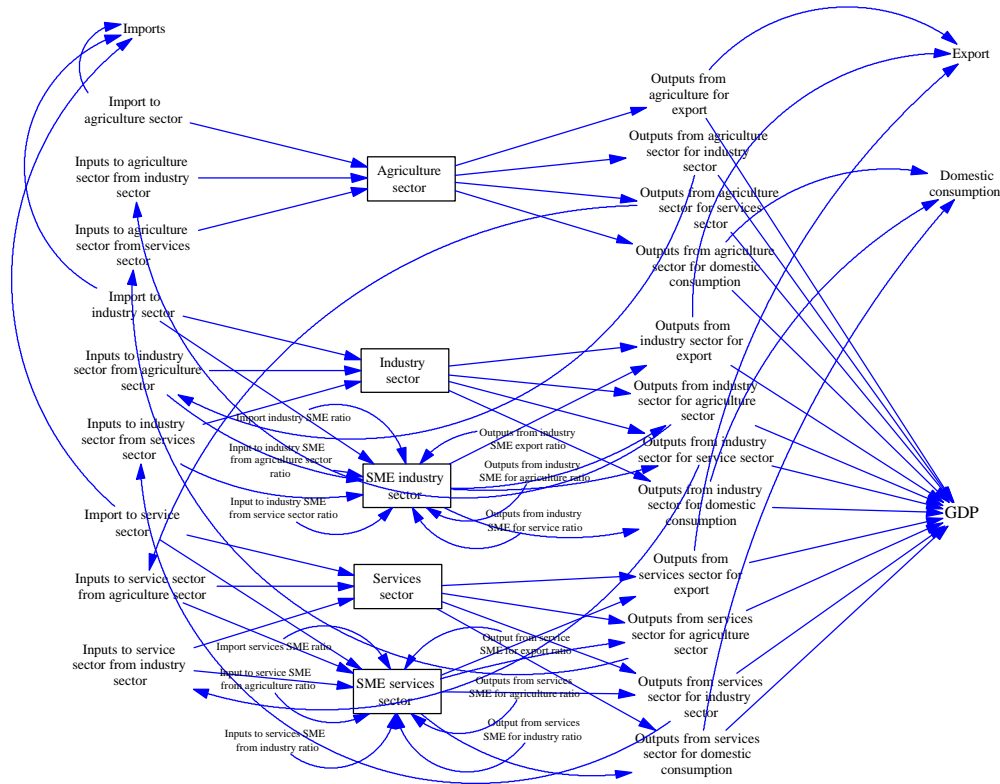


Chart 2: Outline of macro model for check the SME portion

Second macro model is SME sector-model and we focused on major sub industries and how impact was effected with the change of components. In this model, we looked closely at the impact of industry adjustment to major sub industry group. To make things simple, we only considered agri-process products, textiles, machines and electronic products related to export and could change export ratio. Also, we simulated the development stage with change of the light industry ratio and the heavy industry ratio. Finance and utility worked as accelerators of productivity to each sub industry sector. To check the linkage between multi national companies and domestic companies, we used export ratio. It may actually not exactly describe the linkage of multi national companies and domestic companies in the domestic market but we did not have suitable statistic data to know the actual trade between multi national companies and domestic SME within domestic market but many governments have export statistic data of SME sector.

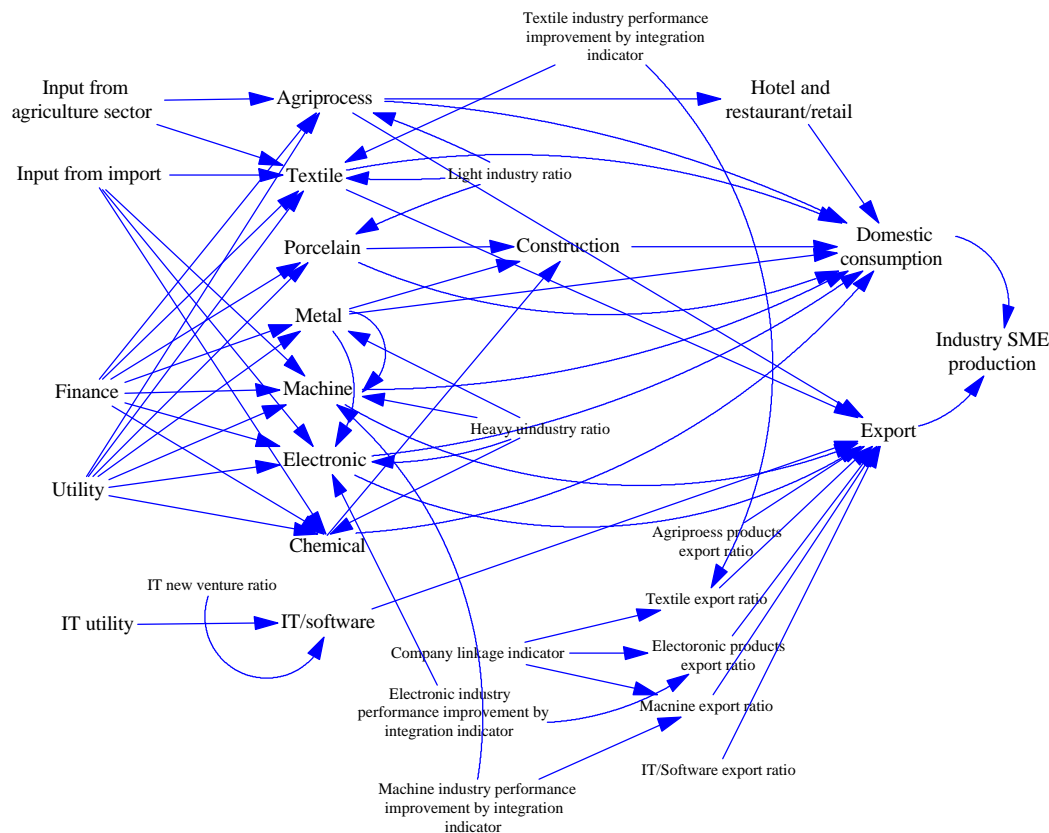


Chart 3: Outline of macro model for SME industry sub sector

8-1) Hypothesis of macro model 1: Structure adjustment

Is structure adjustment policy which rapidly changes the share of agriculture, industry and services sector useful or not? Using cross sector production data matrix, we simulated structure adjustment policy. Based on data of productivity of industries, we set that productivity of agriculture as an S curve. It means, the productivity growth of agriculture will stop depend on GDP and development stage. It felt strange that the simulation results of structure adjustment between agriculture, industry and services did not have much impact but structure adjustment within the industrial sub sector had much impact when adjustment could be successful to increase the productivity of the sector. Combination of industry sub sector impacted and performance of industry sector leading to the growth of GDP, as fine tuning made for high performance.

If industry development relies too much on domestic agriculture products, replacement of export raw material type industry development, economic development fall into limit of growth. In cases where we introduced turbulence in purchasing of raw material, we found it easy to see that turbulence impacted growth of other sub industries.

We also checked the strengthening of linkage between industry sub sectors with change of parameters and showed stabilization of procurement and consumption. We find this policy is quite useful for industry development. Such mechanisms for maintaining linkage between sub sectors and large scale enterprises have been developed in Japan by private initiatives as virtual subsidiary (Keirestu) and succeeded. Malaysia and Indonesia introduced development of such mechanism in their industry development master plan and in Malaysian case, they succeed. They encouraged development of a friendly linkage between multi-national companies and domestic companies, that caused stabilization of domestic raw material consumption. However, in the Indonesian case, political

change caused a crash and the linkages failed. Many economists also criticized the linkage strengthening policy saying that it creates barriers to free competition market mechanism.

8-2) Hypothesis of macro model 2: Impact of industry integration

Many developing countries establish the industry estate and integrate SME into single industry sub sector. In China and also Japan several decades ago, there were so many integrated sub sectors in one estate and makes cities. In the same manner, we assumed such integration strengthens the export power and conducted the simulation. As mentioned before, we have no choice but to rely on the statistic data of exports in SME sector, we assumed that industry integration can increase the export ratio. This integration may also be related to the light industry ratio and the heavy industry ratio but not create linkage in this model. The simulation results were the same as hypothesis 1. Integration is useful and has impact on industry development. However, this simulation result was not consistent with simulation results in micro model. In the simulation of micro model, integration gives negative impact in relation to reduction of the market share. But our micro SME model does not consider foreign markets at all.

As our observation, many developing countries are eager to develop the integration such as industrial estate or industrial zone. Large scale integrated industry zones for textiles, machines and IT (called high tech park) were developed in China. In other countries such as Indonesia, the Philippines, Bangladesh and Thailand, they developed export oriented industry estates and/or trading and were successful in contributing to increased exports.

8-3) Hypothesis of macro model 3: Could IT/software bring sound industry development?

We added IT/software parameters into our macro model. As IT/software industry does not have strong linkage with other industry sub sectors, the success of this sector development increased exports in a straight line and finally the industry SME production. IT/software sector production is controlled by IT utility, which is telecommunication infrastructure and IT new venture ratio. This part is so simple and easy to control but again, our model did not consider the linkage with the world market. As we could not find suitable statistical data for export of IT/software industry and the relation with the world market, we could not make a conclusion. Development of other sub industries were affected by other industry sub sector development such as the development of electronic and machine industries which have limited material support from metal industry. Our model is simple toward the relationship between industry sub sector but the relation of supplier and consumer limiting the straight and sound growth of sub industry sector production. This relationship may have to be studied further in the supply chain area.

Maybe the structure of our model is too conservative for SME development policy which shifted to high tech or IT/software focus development recently. However, our old fashioned traditional style simulation concluded fine tuning style balanced industry sub sector development is most effective for sound SME sector development. Also, need to change from domestic consumption oriented to export oriented to increase the market size for production of SME sector.

8-4) Hypothesis of macro model 4: What is necessary for development?

Several studies and research are conducted on Asian Miracle which focus on the success of high and long socio-economic development in East Asia. Is SD could possibly trace on this success mechanism? In other words, what is necessary for under develop country could reach to developed? Is it the initial condition shown in table 2 and resources rich country could take easy take off? Which gives much impact to the sound development, finance or infrastructure? For check this matters, we developed the agro-process focused model that makes much detailed of the macro model of chart 3. The mechanism shows in chart 4. Main flow goes crops, vegetable and other agriculture raw material to self-consumption and keeps balance in under developed situation. Gradually, people use part of those raw materials for food processing and handy craft products processed in house such as bamboo basket for agriculture use. Its goes to domestic market mainly and gradually shift to export. For push the products to domestic and international market, farmer get petty cash and this cycle (thick blue

arrow) makes reinforcement cycle. In such phenomenon could possibly cause for change with distribution infrastructure, finance and technical assistance and merchandise infrastructure (bold type parameters). Initial condition one, import replacement and two, raw material replacement could check using this model. Our simulation results shows not difference with initial condition for long term.

Limit of handy craft type production capability, industry need to shift from handy craft production to small factory type manufacturing (red arrow). If domestic market is stable or export market is stable, industry could keep developing. But disturbance of international market links with export and industry heavily rely on the export, it is very hard for keeps maintain the stable. Success of the development depends on the success for switch to small factory type manufacturing and could keep adjusting to the fluctuation of the world market.

In the reality, domestic market also is infected with international market and domestic production affected by import goods even agro-process products. It's depends on the cost and distribution infrastructure. Also, even petty cash could hardly provided to the poor farmer even in merchandise infrastructure that is developed some levels for many developing countries.

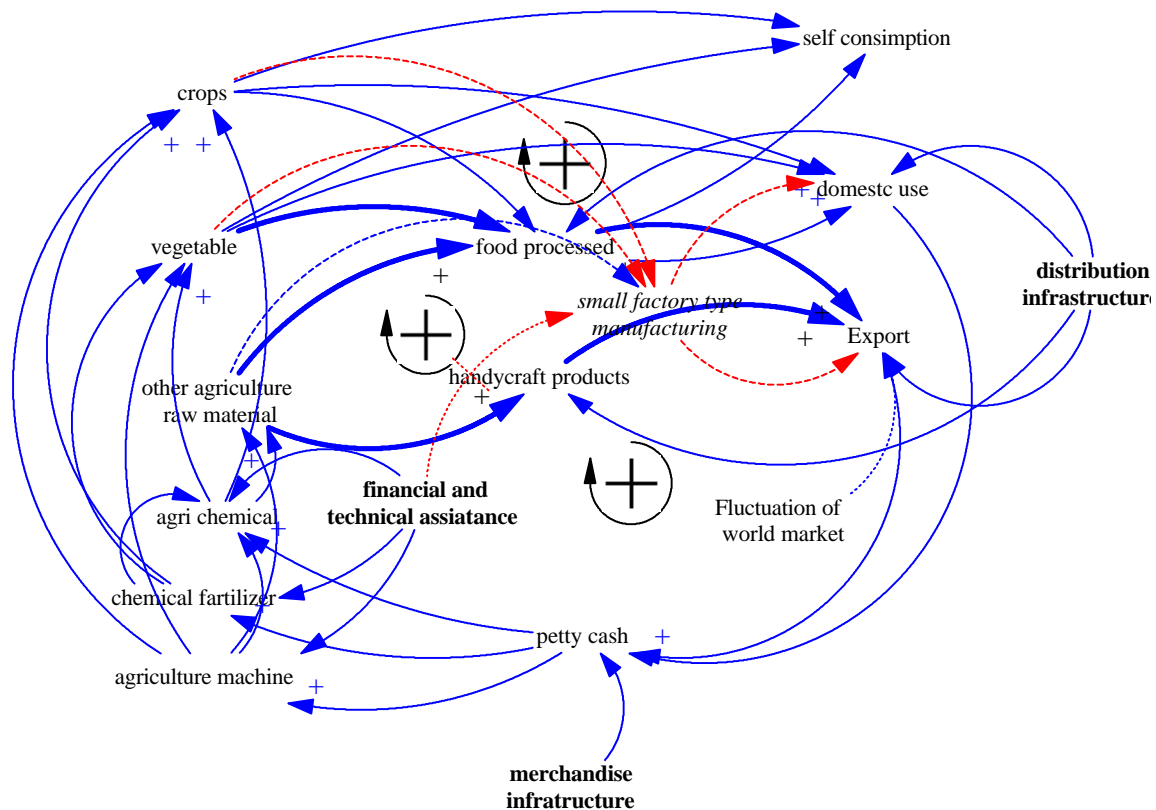


Chart 4: Outline of macro model for SME industry sub sector for focus on agri-process industry

9. Conclusion

It is not with one packaged completed model simulation, however, with combined use of several models for SME industry, we concluded that:

- 1) It is almost impossible for self develop of industries by their own efforts. Developing country could being stable if keep maintain within self consumption cycle or domestic market oriented. However, when involved in the world market:

2) Success of development mean almost fine tuning of many effective factors and adjust for fluctuation coming from macro market.

And several mechanism may useful for stable toward macro market fluctuation such as:

3) Financial assistance and financial assistance structure (smooth banking and/or guarantee scheme) is most important impact for SME industry development.

3) Linkages with multi-national or large scale company also have impact to make stable of the market.

But:

5) These simulation results does not include human side emotion such as weak for corruption that many times makes barrier for development.

10. Further study.

We selected the way to simplify the model to avoid the chaotic behavior of SME. However, as mentioned before, SME itself have complex nature and can easily fall into chaotic management situations through failure of decision making on facility investment. It may be worthwhile to study how the total SME sector will behave if we develop the SME linkage model. Kobayashi already conducted a model like the Japanese local government model and built a linkage model of the 47 prefectures. In this model, each prefecture behaves as micro model and total linkage could be macro model. In such macro-micro linkage model, composed of industry sub-sector linkage model would be one candidate. Our model is actually rather simplified and does not closely study the impact of tools to sub industry linkage.

Another model for linkage of more than 100 SME models will be a very attractive study. Nobody in SD has yet studied what will happen to the behavior of a macro model that is composed of micro model of chaotic nature. Complexity should be studied more.

11. Bibliography

1. *Study on Knowledge Based Support for SME Sector Development*, JICA, March 2000
2. *Study on Competence of Soft Area Consulting Firms in Japan*, Industry Research Institutes, May 2000
3. *Dynamics of Policy Science Study – Excel System Dynamics*, H. Kobayashi, 1997
4. *Exposition of Exponential Delay*, H. Kobayashi, Policy Sciences Research Report Series #8, May 2000